REMARKS/ARGUMENTS

Upon entry of the present amendment, claims 1-8 and 10-34 will be pending in this application and presented for examination. Claims 1, 10, 12, and 14 have been amended. Claim 9 has been canceled without prejudice or disclaimer.

The amendments to the claims find support throughout the specification as filed. More particularly, support for the amendment to claim 1, is found, *inter alia*, in claims 9 and 14 as originally filed. Claims 10, 12 and 14 have been amended to update their antecedent basis in view of the cancellation of claim 9. No new matter is present in any portion of the present amendment.

Reconsideration of the application is respectfully requested in view of the amendments to the claims and the following remarks.

I. RESTRICTION REQUIREMENT

The Examiner has indicated that restriction to one of the following Groups is required under 35 U.S.C. § 121:

Group I Claims 1-15, drawn to a nanoprocessed textile.

Group II Claims 16-23, drawn to a composition.

Group III Claims 24-29, drawn to a method of making a polymer dispersion.

Group IV Claims 30-34, drawn to a method of dyeing.

Applicants affirm the provisional election made by telephone to prosecute the invention of Group I, with traverse. Applicants maintain that the restriction requirement is improper. Under MPEP § 803.01, there are two criteria for a proper requirement for restriction between patentably distinct inventions:

(A) the inventions must be independent or distinct as claimed; and

(B) there must be a serious burden on the examiner if restriction is required.

Applicants maintain that there is no serious burden on the Examiner to search at the very least, claims 1-15 as elected, and claims 24-34. The present invention provides for

embedded nanoprocessed textiles that are prepared by a process of diffusing a nanoparticle into a polymer-based textile. The suggestion by the Examiner that the nanoprocessed textiles of the invention can be prepared by another method (*i.e.*, Todd, U.S. Patent No. 6,136,044) is simply not true. As such, Applicants respectfully request that the Examiner join claims 24-34 to the elected group and examine claims 24-34 on their merits.

II. FIRST REJECTION UNDER 35 U.S.C. § 102

The Examiner has rejected claims 1-14 under 35 U.S.C. § 102(b) as allegedly being anticipated by Todd (U.S. Patent No. 6,136,044, "Todd"). To the extent the rejection is applicable to the amended set of claims, Applicants respectfully traverse the rejection.

As set forth in MPEP § 2131:

> A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

Applicants assert that each and every element of the claims is not taught or suggested by Todd. Todd teaches a process for dyeing fibers with microparticles by treating a textile with a nucleating solution followed by a metal ion solution. The process as disclosed in Todd requires that a textile be incubated in a nucleating solution for a time sufficient for the nucleating agent to "***penetrate throughout the fibers of the fabric***" followed by immersion of the nucleated textile in a metal ion solution (*see*, column 6, lines 7-11, Todd). The metal ions also penetrate throughout the textile where they are reduced upon contact with the nucleating agent. As stated in Todd, the advantage of his process is that "because the nucleating agent and the metal ion are smaller than a preformed microparticle, greater penetration into the fiber and substructure of the textile was achieved by this method than by the prior art method of preforming the microparticles before dying." (*see*, column 4, lines 9-12, Todd). Thus, Todd teaches a two step *in situ* method for forming a microparticle-textile composition wherein the microparticles penetrate throughout the fiber.

In sharp contrast, Applicants teach an **embedded** nanoparticle as set forth in amended claim 1:

> A nanoparticle processed textile and polymer system, said nanoparticle processed textile and polymer system comprising: a textile material having an **embedded nanoparticle**, wherein said nanoparticle is an inorganic nanoparticle or carbon-black. [Emphasis added].

As illustrated in Figures 1 A-B, Applicants' claimed embedded nanoparticle textile composition is characterized by the feature of having nanoparticles "close to the surface" of the textile, wherein a higher concentration of nanoparticles are located near the surface of the fiber (*see also*, page 5, paragraph 18). Applicants set forth on page 5, paragraph 18:

> As used herein, the phrase "embedded nanoparticle" preferably means that a nanoparticle has diffused into the free volume of the polymer matrix of the textile. As shown in Figure 1A, in the present invention, the majority of the "embedded nanoparticles" are **close to the surface** of the polymer or fiber. Preferably, at least about 60% to about 70% of the embedded nanoparticles which have diffused into the polymer are present just below the surface of the polymer, more preferably at least about 70% to about 80%, and most preferably, at least about 80% to about 90% of the nanoparticles embedded in the polymer or fiber are close to the surface of the polymer. As used herein, the phrase **"close to the surface" means that the nanoparticles which have diffused into the polymer are not widely or evenly distributed throughout the polymer or fiber, but remain closely packed at the surface of the polymer or fiber.** It is believed that the diffusion is controlled by the concentration difference of the substrate and thus, the particles stay in a gradually diluted pattern from the surface to the core of the fiber. **In other words, in a distribution profile, the particles show high density at the surfaces, with a gradual decreasing density toward the core of the fiber or polymer**. In certain aspects, the amount of embedded nanoparticle per textile is about 0.1% to about 20% (w/w) and more preferably about 0.5% to about 5% (w/w).

Todd simply does not teach an **embedded nanoparticle** wherein the nanoparticles **remain closely packed at the surface of the polymer or fiber** as is presently taught and claimed, or wherein the particles show high density at the surfaces with a gradual decreasing density toward the core of the fiber or polymer. As such, Applicants submit that the present claims are not anticipated by Todd. Therefore, Applicants respectfully request that the rejection of the claims be withdrawn.

III. SECOND REJECTION UNDER 35 U.S.C. § 102

The Examiner rejected claims 1-11 and 15 under 35 U.S.C. § 102(e) as allegedly being anticipated by Erskine *et al.* (U.S. Patent No. 6,516,633, "Erskine *et al.*"). To the extent the rejection is applicable to the amended set of claims, Applicants respectfully traverse the rejection.

Erskine *et al.* teach a method for preparing photochromic glass nanoparticles. The method of Erskine *et al.*, comprises mixing a first and second reverse microemulsion together, wherein the first microemulsion contains a water-soluble silver salt and glass-forming components and the second microemulsion contains a halide salt and an initiator of glass formation, to provide a nanoparticle having one or more silver halide particles in the glass (*see*, claim 1, column 8, line 57, bridging to column 9, line 6). Further, Erskine *et al.* disclose that capping agents are added to the microemulsions to result in nanoparticles having reactive sites to allow for chemical attachment of the nanoparticles to a macro-material, such as a textile, fiber, etc. (*see*, column 3, line 63, bridging to column 4, line 33). As such, Erskine *et al.* teach a textile composition having a glass-enclosed silver nanoparticle with reactive functional groups that can attach the nanoparticle to a macro-material. In the nanoparticle textiles of Erskine *et al.*, the nanoparticles are **chemically attached** to the surface of the fiber, for example, via hydroxyl groups (*see*, column 6, lines, 57-62, Erskine *et al.*) to **coat** the surface of the textile.

Erskine *et al.* teach at column 6, lines 50-57:

> The textile-reactive functional groups on the nanoparticle surface (either the surface capping agent or reacted polymer) react with the textile or web, by **covalent bonding**, to permanently attach to the

> textile. This curing can take place either before or after the treated textile is removed from the solution and dried, although it is generally preferred that the cure occur after the drying step.

Applicants teach a completely different type of nanoparticle composition wherein the nanoparticles are **embedded** in a textile such as in a gradient fashion. As amended, claim 1 sets forth a textile material having an **embedded nanoparticle**, wherein the nanoparticle is **an inorganic nanoparticle or carbon-black.** An "embedded nanoparticle" means for example, that the nanoparticles are diffused into the free-volume of the polymer matrix of the textile such that the "embedded nanoparticles" are not evenly distributed throughout the fiber, but rather are distributed in a gradually diluted pattern from the surface to the core of the fiber, with a higher concentration of nanoparticles residing near the surface of the fiber (*see*, page 5, lines, 2-19 and Figure 1A-B). Furthermore, Applicants' embedded nanoparticles show good colorfastness property **without** being covalently attached to the textile (*see*, page 3, lines 4-5).

Erskine *et al.* simply does not teach an **embedded nanoparticle** wherein the nanoparticles **remain closely packed at the surface of the polymer or fiber** as is presently taught and claimed or wherein the particles **show high density at the surfaces**, with a gradual decreasing density toward the core of the fiber or polymer. As a claim is anticipated only if each and every element as set forth in the claim is found in the cited reference, Applicants respectfully request that the rejection be withdrawn.

IV. THIRD REJECTION UNDER 35 U.S.C. § 102

The Examiner rejected claim 1-10 and 12-15 under 35 U.S.C. § 102(e) as allegedly being anticipated by Soane *et al.* (U.S. Pub. No. 2003/0013369). To the extent the rejection is applicable to the amended set of claims, Applicants respectfully traverse the rejection.

Soane *et al.* do not teach or suggest an **embedded nanoparticle** textile composition of the present invention. Soane *et al.* disclose and claim a textile reactive nanoparticle comprising a payload entrapped in a polymeric encapsulator and having a textile

reactive functional group on its surface for attaching to a textile fiber (*see*, claim 1, Soane *et al.*). Similar to Erskine *et al.*, the polymeric encapsulated nanoparticles of Soane *et al.* show good fastness property only because the nanoparticles are **chemically attached to the surface** of the textile, for example, *via* hydroxyl groups (*see*, page 6, paragraph 94, lines, 7-10, Soane *et al.*) resulting in nanoparticles that **coat** the surface of the textile fiber.

Applicants teach and claim an **embedded nanoparticle** textile. As previously stated, the phrase "embedded nanoparticles" means for example, that the nanoparticles are not evenly distributed throughout the fiber, but rather are distributed in a gradually diluted pattern from the surface to the core of the fiber, with a higher concentration near the surface of the fiber (*see*, page 5 lines 2-19 and Figure 1A-B). One way to achieve the gradient distribution of nanoparticles in the textile, is a process wherein the nanoparticle-treated textile is subjected to a heat treatment. Applicants teach that heat treatment opens up more "free-volume" inside the polymer textile and provides the kinetic energy for the nanoparticles to move from the surface of the fiber into the deeper layers thus resulting in a gradient distribution of the nanoparticles in Applicants' composition (*see*, page 14, lines, 1-13).

Soane *et al. teach* nanoparticles which are affixed chemically, and thus permanently affixed on the **surface** of the textile and cannot diffuse into the deeper layers of the textile fibers. Soane *et al.* simply do not teach an embedded nanoparticle textile as is currently taught and claimed. As such, Soane *et al.* do not anticipate the present invention. Therefore, Applicants respectfully request that the rejection be withdrawn.

V. FOURTH REJECTION UNDER 35 U.S.C. § 102

The Examiner has rejected claims 1, 2 and 15 under 35 U.S.C. § 102(b) as allegedly being anticipated by Bauer *et al.* (U.S. Patent No. 5,240,466). The Examiner alleges that Bauer *et al.* teach impregnanting leather with water-insoluble sulfur dyes, the sulfur dye particle size being between 10 nM to 200 nM, and thus forming a nanoparticle impregnated textile fabric of the present invention. To the extent the rejection is applicable to the amended set of claims, Applicants respectfully traverse the rejection.

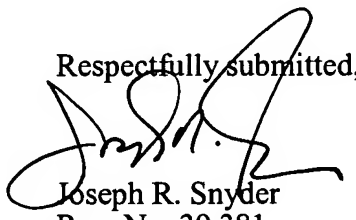
Applicants have amended claim 1 to set forth the nanoparticle processed textile and polymer system comprise a textile material having an **embedded nanoparticle,** wherein the nanoparticle is an inorganic nanoparticle or is carbon-black. Bauer *et al.* simply do not teach that inorganic nanoparticles or carbon-black nanoparticles can be used for dyeing textiles and as such, Bauer *et al.* do not anticipate the present invention. In view of the amendment to claim 1, Applicants respectfully request that the rejection of claims be withdrawn.

VI. CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 925-472-5000.

Respectfully submitted,



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